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2,548,311

ADJUSTABLE LEG LADDER

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Fig. 1

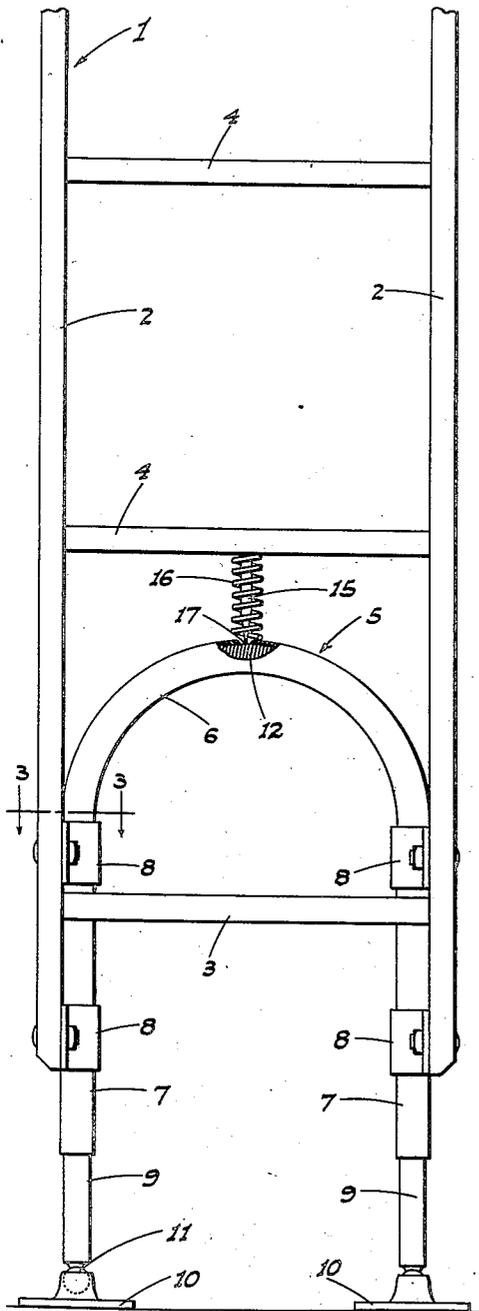


Fig. 2

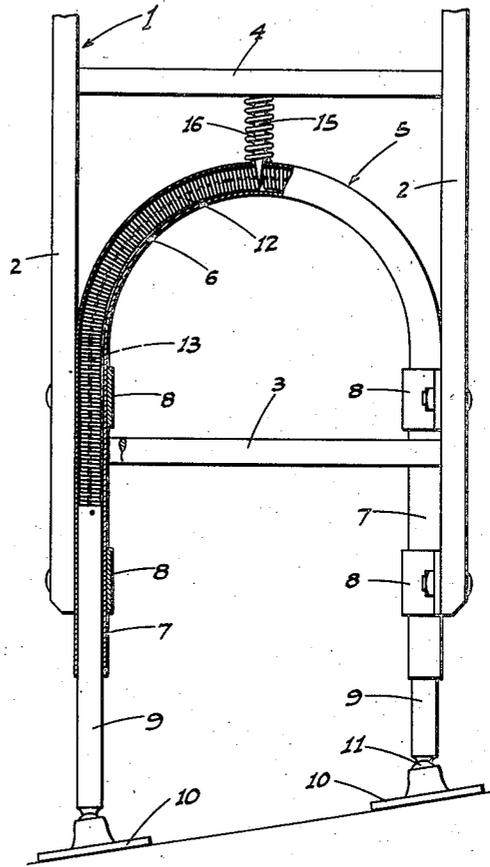
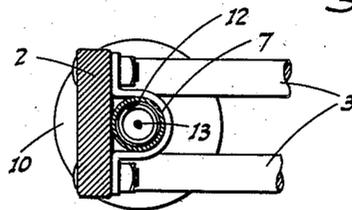


Fig. 3



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ADJUSTABLE LEG LADDER

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6 Claims. (Cl. 228-64)

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This invention relates in general to an improvement in step ladders.

In particular the invention is directed to, and it is an object to provide, a ladder with vertically adjustable legs whereby, when resting on a transversely inclined surface, the ladder may have proper and corresponding footing thereon and yet stand straight as is necessary for convenience and safety.

Another object of the invention is to provide an adjustable leg ladder, as above, which includes a novel mechanism for jointly locking the legs in any position of adjustment thereof; the legs adjusting, and the locking mechanism then operating, both automatically, upon the ladder being manually set straight and the weight of the user being applied to the ladder by stepping on the lower rung thereof, respectively.

A further object of the invention is to provide an adjustable leg ladder wherein the vertically adjustable legs are carried in a novel mount for simultaneous adjustment in opposition; the locking mechanism being arranged to cooperate with the mount to effect the desired locking action.

An additional object of the invention is to provide an adjustable leg ladder which is designed for ease and economy of manufacture.

Still another object of the invention is to provide a practical, reliable, and safe adjustable leg ladder, and one which will be exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings:

Fig. 1 is an elevation of the lower portion of a ladder fitted with the adjustable leg device; the legs being shown in a position of equal projection.

Fig. 2 is a similar view, but shows the device as adjusted to compensate for a transversely inclined surface on which the ladder rests.

Fig. 3 is a fragmentary transverse section on line 3-3 of Fig. 1.

Referring now more particularly to the characters of reference on the drawings, the device is here shown as mounted in connection with a ladder, indicated generally at 1, which ladder includes transversely spaced side bars 2 connected together adjacent its lower end by a pair of bottom rungs 3 spaced front to rear. Above the rungs 3 the side bars 2 are connected, at equally vertically spaced points, by single rungs 4.

The adjustable leg device comprises an inverted, generally U-shaped tubular yoke 5 which

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projects upwardly between the spaced bottom rungs 3.

The tubular yoke 5 includes a substantially semi-circular top portion 6 and integral, transversely spaced tubular guides 7 projecting downwardly from the top portion 6 in parallel relationship.

The tubular guides 7 lie in engagement with the inner faces of the side bars 2 at the lower end portions of the latter, and are secured thereto for relative vertical shifting movement by means of vertically spaced C-shaped guide brackets 8.

A leg 9 is slidably disposed in each of the guides 7 and projects downwardly therefrom, being attached at the lower end to a foot 10 by a universal joint 11.

A longitudinal, flexible but closely coiled helix 12 is disposed in initially slidable relation in the tubular yoke 5 and in engagement between the inner ends of the slidable legs 9; such helix 12 having a relatively close but easily slidable fit in the yoke 5, and extending in the main through the top 6 of said yoke.

In order to maintain the legs 9 in engagement at their inner ends with the corresponding ends of the helix 12, a flexible connector wire 13 extends through said helix and is attached at its ends to the corresponding inner ends of said legs.

By virtue of the above arrangement the legs 9 automatically vertically adjust, in opposition, in the guides 7 when the feet 10 rest on a transversely inclined surface 14 with the ladder 1 standing straight. After the legs so adjust, they are automatically locked in such position the movement that the user of the ladder steps on the bottom rungs 3 and imposes his weight thereon. This locking is accomplished as follows:

The rung 4 immediately above the top 6 of the yoke 5 is fitted, centrally thereof and in alignment with such yoke, with a downwardly projecting wedge pin 15 tapered at its lower end; there being a relatively heavy-duty helical compression spring 16 surrounding the wedge pin 15 between said rung and the top of the yoke. The spring 16 is under load and normally maintains the yoke 5 in a relatively lowered position.

However, after adjustment of the legs 9 to an inclined surface 14, the user steps on the bottom rungs 3, with the result that his weight shifts the ladder 1 downwardly relative to the yoke 5, with the result that the wedge pin 15 passes through a central opening 17 in the top 6 of the yoke 5 and thence engages between adjacent coils of the helix 12. See Fig. 5.

With the wedge pin 15 driven into the helix 12, as above, such helix is prevented from longitudi-

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nal motion, effectively locking the legs 9 in their positions of adjustment; the wedge pin remaining in operative position as long as the weight of the user is imposed on the ladder 1.

The described adjustable leg device provides a very convenient attachment for a ladder; the device providing automatic leg adjustment as the user sets the ladder straight up relative to an inclined surface 14, and thereafter the described locking device also works automatically to the desired end.

The device assures of safe use of the ladder 1 on a transversely inclined surface 14, and this safety is enhanced by virtue of the fact that the feet 10 are universally connected relative to the legs 9 so that the feet lie flush on the surface 14 regardless of the position of leg adjustment.

From the foregoing description it will be readily seen that there has been produced such a device as substantially fulfills the objects of the invention, as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described the invention, the following is claimed as new and useful and upon which Letters Patent are desired:

1. An adjustable leg device for a step ladder, comprising a pair of upstanding transversely spaced tubular guides, means mounting the guides on the lower end of the ladder for simultaneous vertical shifting motion of the guides relative to the ladder, a leg slidable in each tubular guide, means interengaging the legs for simultaneous but opposed sliding in said guides, and means operative upon downward shifting of the ladder relative to said guides to lock said second means against opposed sliding therein.

2. An adjustable leg device for a step ladder, comprising a tubular yoke of inverted generally U-shape, means mounting the yoke on the lower end of the ladder for vertical shifting motion of the yoke relative to the ladder, the yoke including transversely spaced downwardly opening tubular guides, a leg slidable in and projecting downward from each tubular guide, a flexible but non-compressible longitudinal member initially slidable in the upper portion of the tubular yoke and engaged between the inner ends of the legs, and means operative upon downward shifting of the ladder relative to the yoke to lock said member against sliding in the latter.

3. An adjustable leg device for a step ladder, comprising a tubular yoke of inverted generally U-shape, means mounting the yoke on the lower end of the ladder for vertical shifting motion of the yoke relative to the ladder, the yoke including transversely spaced downwardly opening tubular guides, a leg slidable in and projecting downward from each tubular guide, a flexible but non-compressible longitudinal member initially slidable in the upper portion of the tubular yoke and engaged between the inner ends of the legs, and means operative upon downward shifting of the ladder relative to the yoke to lock said member against sliding in the latter; said longitudinal member being a closely coiled helix, and said locking means including a wedge pin movable from a relatively retracted position to an advanced position engaged between adjacent coils of said helix.

4. An adjustable leg device for a step ladder, 75

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comprising a tubular yoke of inverted generally U-shape, means mounting the yoke on the lower end of the ladder for vertical shifting motion of the yoke relative to the ladder, the yoke including transversely spaced downwardly opening tubular guides, a leg slidable in and projecting downward from each tubular guide, a closely coiled helix initially longitudinally slidable in the upper portion of the tubular yoke and engaged between the inner ends of the legs, the ladder including a cross member directly above the yoke, and a wedge pin on the cross member projecting downward toward the yoke, the latter having a top opening through which the wedge pin is adapted to project and wedge between adjacent coils of the helix upon downward shifting of the ladder relative to the yoke.

5. An adjustable leg device for a step ladder, comprising a tubular yoke of inverted generally U-shape, means mounting the yoke on the lower end of the ladder for vertical shifting motion of the yoke relative to the ladder, the yoke including transversely spaced downwardly opening tubular guides, a leg slidable in and projecting downward from each tubular guide, a closely coiled helix initially longitudinally slidable in the upper portion of the tubular yoke and engaged between the inner ends of the legs, the ladder including a cross member directly above the yoke, and a wedge pin on the cross member projecting downward toward the yoke, the latter having a top opening through which the wedge pin is adapted to project and wedge between adjacent coils of the helix upon downward shifting of the ladder relative to the yoke; there being a flexible connector wire running through the helix and attached at corresponding ends to the inner ends of the legs.

6. An adjustable leg device for a step ladder, comprising a tubular yoke of inverted generally U-shape, means mounting the yoke on the lower end of the ladder for vertical shifting motion of the yoke relative to the ladder, the yoke including transversely spaced downwardly opening tubular guides, a leg slidable in and projecting downward from each tubular guide, a closely coiled helix initially longitudinally slidable in the upper portion of the tubular yoke and engaged between the inner ends of the legs, the ladder including a cross member directly above the yoke, and a wedge pin on the cross member projecting downward toward the yoke, the latter having a top opening through which the wedge pin is adapted to project and wedge between adjacent coils of the helix upon downward shifting of the ladder relative to the yoke; there being a compression spring surrounding the wedge pin between the cross member and the top of the yoke.

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